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CALIFORNIA UTILIZATION OF LINSEED OIL AND GENERAL ECONOMIC FACTS RELATING TO FLAXSEED

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CALIFORNIA UTILIZATION OF LINSEED OIL AND GENERAL ECONOMIC FACTS RELATING TO FLAXSEED

E. W. Braun [1]

Introduction

At the present time California has little commercial acreage of flaxseed. Grain growers in certain sections of the state are, however, considering the planting of it. A brief presentation of the principal supply and demand aspects of the flaxseed industry is, therefore, timely. California is now utilizing, in the form of linseed oil, the equivalent of 600,000 to 650,000 bushels of flaxseed. In the event that flaxseed becomes a commercial crop in California and market prices for flaxseed become established at San Francisco and Los Angeles, such prices may be expected to average somewhat above Minneapolis prices as long as California remains a deficit area for flaxseed.

Flaxseed is produced commercially for the linseed oil and residue which it yields under a process of crushing. Linseed oil finds its principal use in the manufacture of paints and varnishes. Its next important use is found in the manufacture of linoleum and felt-base floor coverings. Oilcloth, patent and imitation leather, printers' ink, foundry oils, putty, and soft soaps offer minor market outlets for the oil.[2] Linseed meal and linseed meal cake, residue or by-products of the oil-crushing process, are widely used in this country as high protein concentrate feeds for livestock, principally dairy cows.

Volume of Linseed Oil Utilized in California

A survey of the probable volume of linseed oil used in California during the past few years reveals, as shown in table 1, that linseed oil utilization in California probably reached a total of 7,500 tons in 1929 and has fluctuated near 6,000 tons since that time, which is equivalent to approximately 650,000 bushels of flaxseed. (See table 1.) The oil is brought into the state in a variety of ways. It arrives via rail from eastern crushing centers, and by boat from the Atlantic seaboard. Some oil is imported from foreign countries but a small amount is also exported. Within recent years an appreciable amount of linseed oil has been crushed in California from imported flaxseed. Information covering the movement of linseed meal into California is not available.

World Production of Flaxseed

Flaxseed is one of the minor field crops but, like wheat and barley, is grown in many parts of the world. It enjoys a wide effective demand, has a high value relative to its bulk, and is readily transported. Roughly speaking, there are four centers of flaxseed production. They are (1) Argentina and

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[2] United States Tariff Commission. Report on Linseed Oil, 1929: 3. 1929.

TABLE 1

Volume of Linseed Oil Utilized in California, 1928-1932

Year	Rail movement in	San Francisco water movement in*	Los Angeles water movement in†	Probable crushing in San Francisco‡	Estimated total movement in	Exports from San Francisco	Probable net California utilization
	1	2	3	4	5	6	7
	tons	tons	tons	tons	tons	tons	tons
1928	4,500	554	338	--	5,392	82	5,310
1929	3,600	3,028	882	--	7,510	54	7,456
1930	2,130	3,220	907	--	6,257	65	6,192
1931	2,490	1,735	827	818	5,870	41	5,829
1932	1,860	1,247	949	1,876	5,932	15	5,917

* Mainly intercoastal movement although some imported oil is included.

† Not including oil received from San Francisco, Portland, or Seattle.

‡ Includes oil from any flaxseed receipts whether of foreign or domestic origin.

Sources of data:

Col. 1: Courtesy of common carriers.

Col. 2: San Francisco Chamber of Commerce, International Trade Dept.

Col. 3: Los Angeles Chamber of Commerce, Dept. of Foreign Commerce and Shipping. (Data were furnished on a July to June fiscal year and are here converted to an estimated calendar year by straight interpolation.)

Col. 4: Calculated from flaxseed imports considering 56 pounds of flaxseed to yield 2.5 gallons of oil. (One gallon of oil weighs 7.5 pounds.) Flaxseed imports compiled from reports of the U. S. Dept. Commerce, Bureau of Foreign and Domestic Commerce, San Francisco office.

Col. 5: Total of cols. 1 to 4.

Col. 6: Same as col. 4.

Col. 7: Col. 5 minus col. 6.

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Uruguay in South America, (2) Russia, (3) adjoining regions in the United States and Canada, and (4) India. Table 2 gives the five-year, 1928-1932, average production and relative importance of the principal flax-producing countries. The Argentine production, by far the largest portion of the total, amounted to 48.4 per cent or nearly one-half of the world total of 140,473,000 bushels. Russia, ranking second, produced 19.6 per cent or one-fifth of the total. The United States and India each supplied approximately one-tenth of the total. Only 2.1 and 2.4 per cent, respectively, are attributable to Canada and Uruguay. All other countries produced 5.6 per cent.

TABLE 2

World Flaxseed Production by Principal Countries, Average, 1928-1932

Country	1928-1932 average	Per cent of total
	1	2
	thousands of bushels	per cent
Argentina	68,003	48.4
Russia	27,552*	19.6
United States	15,995	11.4
India	14,744	10.5
Canada	2,997	2.1
Uruguay	3,329	2.4
Other countries	7,853	5.6
World total	140,473	100.0

* Average for 4 years.

Sources of data:

U. S. Dept. Agr. Yearbook of Agriculture, 1933: 457. 1933. Supplemented by World Flaxseed Prospects FF-86: 5. July, 1933.

United States Production and Net Imports of Flaxseed

The United States, though one of the largest producing countries, imports almost as much as it produces. Table 3 gives, annually, the United States production and net imports of flaxseed since 1909. It also gives domestic production expressed as a per cent of total supply utilized. During a five-year period, 1909-1913, United States flaxseed production plus net imports amounted to an average of 27,160,000 bushels annually, of which 19,543,000 bushels or 72 per cent were produced domestically. (See table 3.) The period of highest total supply since 1909 occurred during the five years 1924-1928, the average annual

TABLE 3

Flaxseed Supplies in the United States and Domestic Production as a Percentage of Total Supplies, 1909-1932

Crop year	United States production	Net imports* September to August	Total supply†	United States production as a per cent of total
	1	2	3	4
	thousands of bushels	thousands of bushels	thousands of bushels	per cent
1909-10	19,699	5,922	25,621	76.9
1910-11	12,718	11,937	24,655	51.6
1911-12	19,370	7,722	27,092	71.5
1912-13	28,073	2,948	31,021	90.5
1913-14	17,853	9,556	27,409	65.1
1914-15	13,749	12,158	25,907	53.1
1915-16	14,030	14,128	28,158	49.8
1916-17	14,296	10,439	24,735	57.8
1917-18	9,164	13,575	22,739	40.3
1918-19	13,369	8,748	22,117	60.4
1919-20	6,770	26,016	33,194	20.4
1920-21	10,900	15,955	26,707	40.8
1921-22	8,107	23,240	31,269	25.9
1922-23	10,520	28,848	39,223	26.8
1923-24	16,563	19,412	36,472	45.4
1924-25	31,237	12,725	44,272	70.6
1925-26	22,337	20,710	43,134	51.8
1926-27	18,537	24,043	43,378	42.7
1927-28	25,183	18,057	43,904	57.4
1928-29	19,140	23,505	43,433	44.1
1929-30	15,910	18,428	34,338	46.3
1930-31	21,287	9,869	31,109	68.4
1931-32	11,798	10,903	21,921	53.8
1932-33	11,841	7,400‡	19,241‡	61.5

* Including linseed oil in terms of seed based on 2.5 gallons of oil to equal 56 pounds or one bushel of flaxseed.

† No allowance made for carryin and carryover.

‡ Preliminary.

Sources of data:

U. S. Dept. Agr. Yearbook of Agriculture, 1933: 456. 1933, except for 1932-33 imports.

1932-33 imports from U. S. Dept. Commerce, Bur. For. and Dom. Commerce. Monthly Summary of Foreign Commerce of the United States.

supply being 43,624,000 bushels, of which 53.4 per cent was domestic production. Since 1928 the United States flaxseed supply has decreased markedly. For the two seasons of 1931 and 1932, total supply amounted to an average of only 20,581,000 bushels or a little less than one-half of the 1924-1928 average. The proportionate decrease was practically the same in both production and net imports. Production and net import trends since 1914 may be readily observed in figure 1. (See figure 1.)

Commercial production of flaxseed in the United States is localized in the spring wheat section of the United States. The principal states are in order of their importance -- North Dakota, Minnesota, South Dakota, and Montana. Table 4, based on a five-year average 1928-1932 production, shows that approximately 96 per cent of a United States total of 16,143,000 bushels is produced in these four states.

TABLE 4

United States Flax Production by States
Average, 1928-1932

State	1928-1932 average	Per cent of total
	1	2
	thousands of bushels	per cent
North Dakota	6,071	37.6
Minnesota	5,913	36.6
South Dakota	2,295	14.2
Montana	1,198	7.4
Other states	666	4.2
Total United States	16,143	100.0

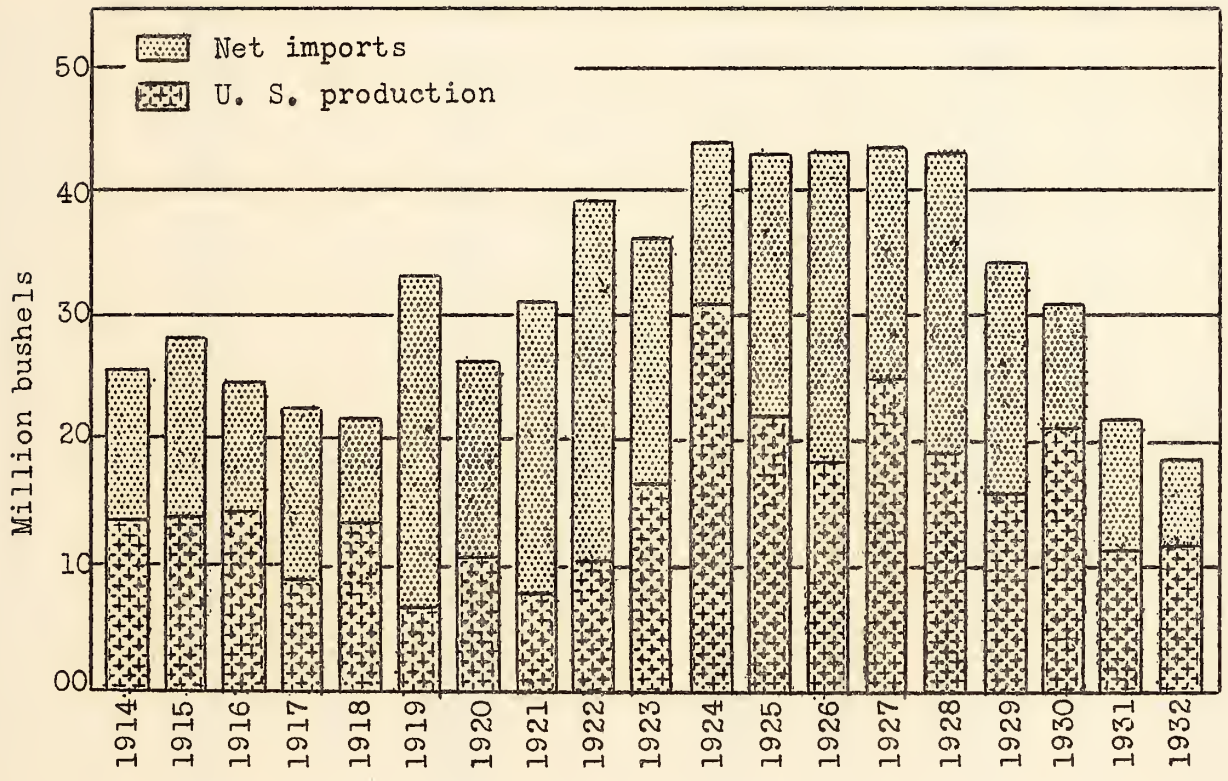
Source of data: Compiled from U. S. Dept. Agr. Yearbook of Agriculture, 1932 and 1933.

Flaxseed Prices at Principal Markets and United States Import Duties

Practically all of the flaxseed imported into the United States originates in Argentina and in Canada, and the bulk of the domestic production is tributary to Minneapolis. Flaxseed prices at Minneapolis, Buenos Aires, and Winnipeg are, therefore, of vital importance to the flax industry of the United States. Crop-year annual prices at these three markets are given in table 5. (See table 5.) The data for two markets, namely, Minneapolis and Winnipeg, extend back to 1909, but for Buenos Aires extend only to 1920. Changes in the price spread between Minneapolis and Winnipeg reflect changes in the import duty on flaxseed brought into the United States. Flaxseed producers in the United States have been benefited by approximately the amount of the tariff, and con-

Figure 1

United States Flaxseed Production and Net Imports
1914-1932



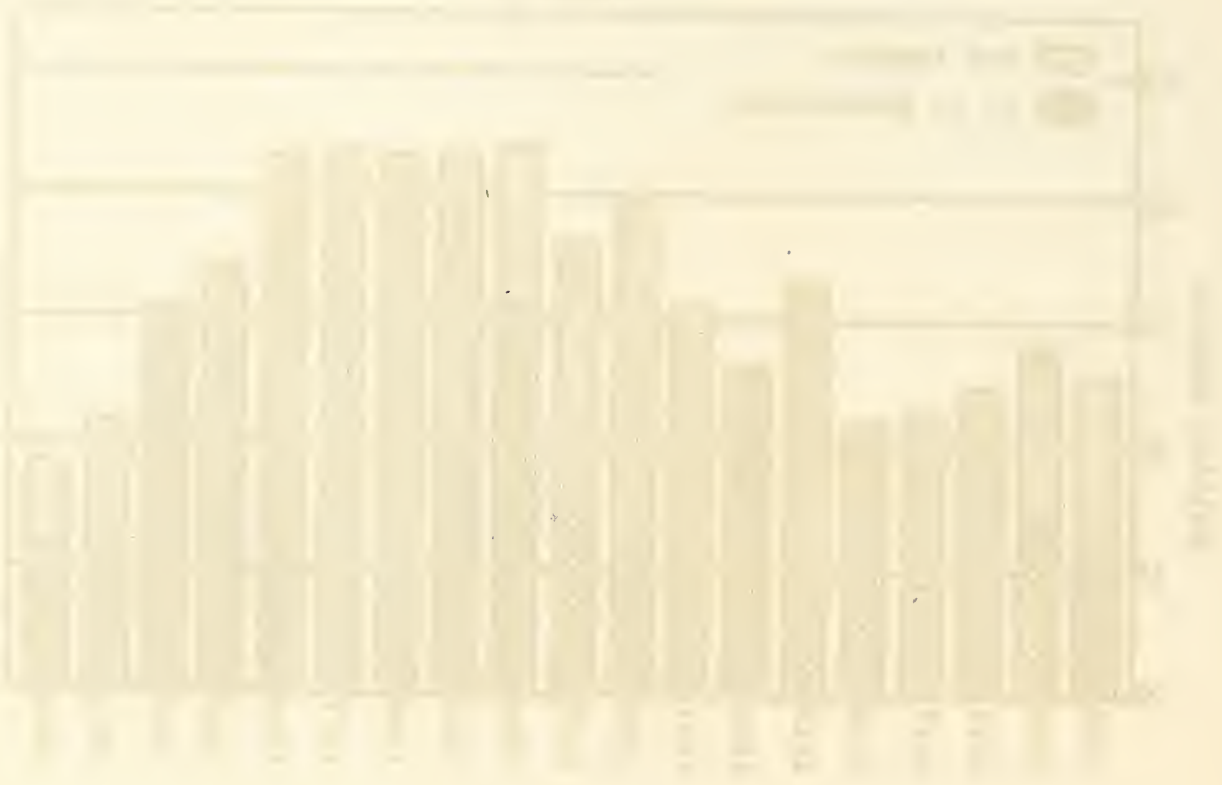


TABLE 5

Flaxseed Prices at Minneapolis, Winnipeg, and Buenos Aires, 1909-1932
(In dollars per bushel of 56 pounds)

Crop year Sept.-Aug.	Minneapolis* No. 1 Northern	Winnipeg No. 1 Northwestern	Buenos Aires (Argentina)	Minneapolis above Winnipeg	Minneapolis above Buenos Aires
	1	2	3	4	5
	dollars	dollars	dollars	dollars	dollars
1909-10	1.97	1.76	--	0.21	--
1910-11	2.50	2.23	--	0.27	--
1911-12	2.18	1.97†	--	0.21	--
1912-13	1.42	1.22	--	0.20	--
1913-14	1.50	1.31	--	0.19	--
1914-15	1.70	1.49	--	0.21	--
1915-16	2.00	1.80	--	0.20	--
1916-17	2.80	2.60	--	0.20	--
1917-18	3.70	3.53	--	0.17	--
1918-19	4.07	3.95	--	0.12	--
1919-20	4.73	4.27	--	0.46	--
1920-21	2.20	1.78	1.57	0.42	0.63
1921-22	2.16	2.02	1.69	0.14	0.47
1922-23	2.59	2.24	1.81	0.35	0.78
1923-24	2.44	2.11	1.74	0.33	0.70
1924-25	2.63	2.41	2.18	0.22	0.45
1925-26	2.53	2.11	1.78	0.42	0.75
1926-27	2.25	1.94	1.67	0.31	0.58
1927-28	2.21	1.88	1.68	0.33	0.53
1928-29	2.29	2.09	1.72	0.20	0.57
1929-30	3.11	2.39	2.01	0.72	1.10
1930-31	1.76	1.09	0.97	0.67	0.79
1931-32	1.36	0.81	0.62	0.55	0.74
1932-33	1.20†	0.74≠	0.70†	0.46	0.50

* Crop year begins August 1.

† Average for 11 months.

≠ Average for 10 months.

Sources of data:

Minneapolis

1909-1931: U. S. Dept. Agr. Yearbook of Agriculture, 1933: 456. 1933.
1932-1933: U. S. Dept. Agr., Bur. Agr. Econ. Crops and Markets.

Buenos Aires

Sept. 1920-Dec. 1925: U. S. Dept. Agr. Yearbook of Agriculture, 1925: 841. 1926.
Jan. 1926-Dec. 1927: U. S. Tariff Commission. Report on Flaxseed, 11: 1929.
Jan. 1928-Aug. 1929: U. S. Dept. Agr. Foreign News on Flax and Flaxseed, F.S. FF-46. Dec. 30, 1929.
Sept. 1929-July 1933: U. S. Dept. Agr., Bur. Agr. Econ. World Flaxseed Prospects, FF Nos. 59, 71, 82, and 86.

Winnipeg

Sept. 1909-Dec. 1913: U. S. Tariff Commission. Agricultural Staples and the Tariff, Information Series 20: 145. 1920.
Jan. 1914-Dec. 1925: U. S. Dept. Agr. Yearbook of Agriculture 1925: 842. 1926.
Jan. 1926-July 1933: Same as for Buenos Aires.

sumers of flaxseed products in the United States have had to pay a higher price for flaxseed products by an amount approximately equal to the import duty. The rates of duty which have prevailed since 1909 are given in table 6.

TABLE 6

United States Import Duty Rates on Flaxseed and Linseed Oil, 1909-1930

Year of Tariff Act	Flaxseed per bushel*	Linseed oil per gallon†
	1	2
	cents	cents
1909	25	15.00
1913	20	10.00
1921	30	10.00
1922	40	24.75
1930	65	33.75

* Bushels of 56 pounds.

† Gallons of 7.5 pounds.

Sources of data:

1909-1922: U. S. Tariff Commission. Report on Linseed Oil, 1929: 2. 1929.

1930: U. S. Dept. Commerce. Statistical Classification of Imports into the United States with Rates of Duty, Schedule A: 26. 1930.

Volume of Linseed Oil Crushed in the United States

Approximately 90 per cent of the flaxseed produced and imported into the United States is crushed for oil. The amount crushed and the volume of oil produced annually, 1919-1932, are given in table 7. (See table 7.) Exports and imports of linseed oil in the form of oil have been very small in recent years, exports amounting to only slightly over 1,000,000 pounds and imports less than that. Since 1922 annual imports of oil have decreased from 72,000 tons to less than 100 tons.

Relation of Flaxseed Prices to Linseed Oil Prices and Linseed Meal Prices

Because linseed oil is the principal flaxseed product, the price of linseed oil and the price of flaxseed are very closely related. A determination of the exact cause and effect relationships between the two is, however, beyond the scope of the present study. New York prices of raw linseed oil and Minneapolis prices of flaxseed are shown in figure 2. (See figure 2.)

TABLE 7

Flaxseed Crushed in the United States and Volume of Linseed Oil Produced, 1919-1932

Crop year (Sept. to Aug.)	United States* flaxseed supply	Flaxseed crushed	Per cent of supply crushed	Linseed oil produced
	1	2	3	4
	thousands of bushels	thousands of bushels	per cent	millions of pounds
1919-20	33,194	26,969	81.2	505
1920-21	26,707	24,828	93.0	466
1921-22	31,269	23,276	74.4	435
1922-23	39,223	33,806	86.2	647
1923-24	36,472	35,529	97.4	659
1924-25	44,272	40,996	92.6	758
1925-26	43,134	39,716	92.1	732
1926-27	43,378	40,136	92.5	745
1927-28	43,904	41,795	95.2	783
1928-29	43,433	42,313	97.4	788
1929-30	34,338	31,070	90.5	567
1930-31	31,109	28,777	92.5	522
1931-32	21,921	19,751	90.1	365
1932-33†	19,241	17,631	91.6	325

* No allowance made for carryin and carryover for any given crop year.

† Preliminary.

Sources of data:

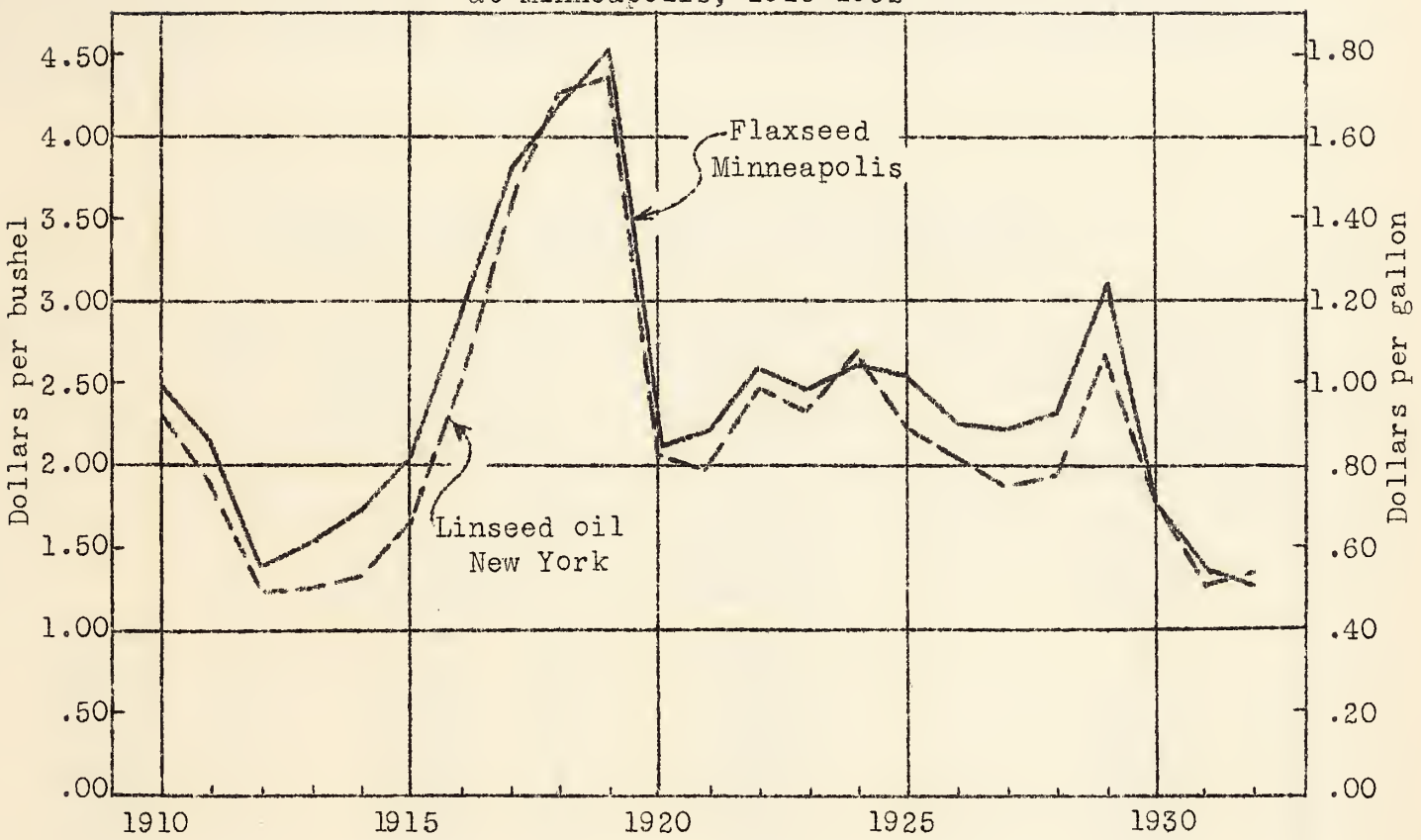
Col. 1: U. S. Dept. Agr. Yearbook of Agriculture, 1933: 456. 1933.

Cols. 2 and 4: 1919-1930: Same as col. 1 but taken from page 462.
1931-1932: Courtesy of O. C. Stine, in charge, Division of Statistical and Historical Research, U. S. Dept. Agr.

Col. 3: Col. 2 divided by col. 1.

Figure 2

Raw Linseed Oil Prices at New York and Flaxseed Prices at Minneapolis, 1910-1932



It will be noted from table 8 that the relationship between flaxseed prices and prices of linseed meal is also close. The relationship is, however, not as close as is true in the case of flaxseed and linseed oil. This is to be expected because linseed meal is in the nature of a by-product, consequently there is little relationship between the amount placed on the market and prevailing prices.

TABLE 8

Flaxseed Prices at Minneapolis and Linseed Meal Prices at Minneapolis and San Francisco

Crop year*	Price of flaxseed at Minneapolis	Price of linseed meal at Minneapolis	Price of linseed meal at San Francisco
	1	2	3
	dollars per bushel	dollars per ton	dollars per ton
1921-22	2.19	48.19	--
1922-23	2.58	49.35	--
1923-24	2.44	47.66	53.12
1924-25	2.63	48.18	52.54
1925-26	2.53	50.09	53.70
1926-27	2.25	48.59	51.68
1927-28	2.21	51.58	52.24
1928-29	2.29	58.20	53.50
1929-30	3.11	52.24	52.94
1930-31	1.76	33.08	35.87
1931-32	1.36	26.38	28.78
1932-33	1.27	23.05†	25.55†

* Flaxseed crop year, August to July. Linseed meal crop year, September to August.

† Average for 11 months.

Sources of data:

Flaxseed at Minneapolis 1909-1922: U. S. Dept. Agr. Yearbook of Agriculture, 1932: 646. 1932.
1923-1931: U. S. Dept. Agr. Yearbook of Agriculture, 1933: 462. 1933.
1932: U. S. Dept. Agr. Crops and Markets, monthly issues.

Linseed meal at Minneapolis 1921-1929: U. S. Dept. Agr. Yearbook of Agriculture, 1930: 667. 1930.
1930-1933: U. S. Dept. Agr., Bur. Agr. Econ. Crops and Markets.

Linseed meal at San Francisco 1923-1925: From the San Francisco Chronicle.
1926-1930: Compiled from the San Francisco Examiner.
1931-1933: Compiled from the Weekly Feed Market Review, San Francisco.